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L11: Entry 35 of 35 F TD Apr 1, 1994

DOCUMENT-IDENTIFIER: NB94049
TITLE: Dynamic Gain Equalization S MAN/WAN using WDMA
and Semiconductor Optical Amplifi

TBTX:
This document contains drawings, f ls, and/or symbols that
will not appear on line. Request from ITIRC for
complete article. - Disclosed is a qualization scheme
using planar gratings and semicon ical amplifier
arrays to overcome the near-far p nonequal
transmission spectra present in a - A metropolitan
area network or wide area network ) using WDMA has the
potential near-far problem where al signals
originating from different locati nce different
attenuation. Furthermore, fibers amplifiers used in
such a network also have nonflat spectra and thus
different wavelengths experience gain and attenuation
even though they travel through ysical path. Most of
the existing studies on gain equa as been focused on
equalizing the nonflat gain spect optical amplifiers.
Gain equalization using fiber gra ed in the 'Er' sup
3+ fiber amplifier was proposed i h a larger
equalization bandwidth is achiev e can not adjust
the gain dynamically. Two-stage f r with offset
gain peaks was proposed in 2] to equalize (by means
of pump power) the optical signal different
channels in a WDMA system. This ever, has a very
limited equalized bandwidth of &a ain equalization
can also be achieved through cont ransmission
spectra of the optical filters. nciple, an
equalized 29-channel WDM system was demonstrated
using a Mach-Zehnder Interferome Acousto-optic
tunable filter (AOTF) has also b ualize gain
spectra for a very wide transmis ]. Through the
injection of multiple RF frequen RF signal
transmitting at a different magn trary
transmission characteristic can . The resolution
of this scheme, however, is limi tion of an an
AOTF. Fig. 1 shows the proposed its of: o
wavelength demultiplexer (e.g., emultiplexes
the incoming multiple optical si dual
wavelength channels, o optical a s, which are
responsible for the gain adjustm al wavelength
channels, o wavelength multiplex ) which
multiplexes the gain-equalized to a single
output. - The essence of this c heme relies
on the dynamic adjustment of th ical amplifier
through modifying the injection plifier.

Furthermore, the gain of the opt is dynamically
adjusted to achieve a constant c ver at the
output of the optical amplifier crease/decrease
of the incoming optical power. T adjustment is
achieved by a close loop monito shown in Fig.
2, which o measures the voltage erminals of a
semiconductor optical amplifier e average
voltage drop by using a low-pass es the
resulting value with the desire or signal is
used to correct the gain of the . This is
justifiably used because only th ics needs to
be controlled in the amplifier. f this
approach is the wide equalizati able through
grating and semiconductor ampli ) as well as
high resolution achieved by the annel
spacing). Furthermore, crosstal on is
virtually nonexistent in this s one channel
is being amplified. - The poten the power
consumption required for amplif ation can thus
necessitate the use of a contro ronment. - The
wavelength multiplexer can be r a bulk
optical grating and a planar wa olographic
gratings can be employed but it to be
improved to be practical. In pa uggesting on
the planar waveguide grating be ed structures
can avoid beam diffraction (2) ed with
semiconductor material which ca y integrated
with optical amplifiers. The op uld be
realized with an array of semic le amplifier
such as wide bandwidth multiple r amplifier.
Similar to the wavelength multi ngth
demultiplexer can be realized w bulk grating
or waveguide grating. It should waveguide
multiplexer, optical amplifier demultiplexer
can be totally integrated by me in
semiconductor material. Referen , I. Laming,
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